Journal of Pedagogical Research
Volume 8, Issue 1, 2024
https://doi.org/10.33902/JPR.202424547

Research Article

Teacher innovativeness: The effect of self-efficacy, transformational leadership, and school climate

Rais Hidayat[1] and Yuyun Elizabeth Patras[2]

[1]*Universitas Pakuan, Indonesia (ORCID: 0000-0003-3561-0127)*
[2]*Universitas Pakuan, Indonesia (ORCID: 0000-0002-8209-0569)*

This paper aims to identify variables and indicators that are important to improving teacher innovativeness in Indonesia. The paper adopts quantitative research design and Scientific Identification Theory for Operation Research in Education Management (SITOREM). The study population consists of 145 Indonesian state vocational high school teachers. Four questionnaires (transformational leadership, organizational climate, self-efficacy, and teacher innovativeness) assist in the collection of data using survey techniques. The results show that teacher self-efficacy and innovation can be improved by implementing transformational leadership and fostering a conducive school climate. To improve the quality of educational organizations, this study recommends priority variables and indicators for policy-makers.

Keywords: Organizational climate; Self-efficacy; Teacher innovativeness; Transformational leadership

Article History: Submitted 31 September 2023; Revised 3 December 2023; Published online 28 January 2024

1. Introduction

The changing industrial environment and competition between schools require school management to improve the quality of teaching. To meet the needs of students, schools need to invest in hardware and hire teachers who are competent and innovative. It is crucial for teachers to innovate in the way they carry out learning, both individually and collectively (Nguyen et al., 2021). To accomplish this, schools need to develop new ideas, methods, or strategies that teachers can easily understand and adopt continually (Chou et al., 2019). In order to improve the quality of teaching and education, teachers and schools need to be able to accept new views, new teaching methods, curriculum design, and new educational technology (Hill & France, 2020; Nguyen et al., 2019; Nurjaman et al., 2019; Yilmaz & Bayraktar, 2014).

Efforts to improve the quality of teaching in schools cannot be separated from the ability of teachers to innovate and their self-efficacy (Gkontelos et al., 2023; Lambriex-Schmitz et al., 2020). The role of the teacher in innovative teaching is to encourage students to learn from experiences inside and outside of the classroom (Chand et al., 2020). Innovative teaching refers to the process by which teachers use new and cutting-edge methods and materials when interacting with

Address of Corresponding Author

Rais Hidayat, PhD, Education Administration Program, Post Graduate School, Universitas Pakuan, Jalan Pakuan No. 1 Kota Bogor, West Java, Indonesia.

✉ rais72rais@gmail.com

How to cite: Hidayat, R. & Patras, Y. E. (2024). Teacher innovativeness: The effect of self-efficacy, transformational leadership, and school climate. *Journal of Pedagogical Research, 8*(1), 208-222. https://doi.org/10.33902/JPR.202424547

students, thus fostering students' creative thinking (Hosseini & Haghighi Shirazi, 2021). True self-efficacy teachers believe they can successfully overcome problems in teaching students inside and outside the classroom (Sánchez-Rosas et al., 2022; Zainal & Mohd Matore, 2021). Teachers' self-efficacy refers to their confidence in solving teaching problems and their ability to continue learning from the environment and his life experiences in order to succeed as teachers (Musadad et al., 2022). Teacher innovation and teacher self-efficacy are crucial variables in determining the progress of education. Therefore, efforts to improve both must continue to be sought and carried out, including in this study.

Various studies have been conducted to improve teacher innovativeness and self-efficacy. However, the study only focused on the direct effect of one variable on teacher efficacy and self-efficacy. Among these studies is the immediate positive and significant influence of transformational leadership on teacher innovation (Rad et al., 2021; Vermeulen et al., 2022), a direct positive and significant effect of self-efficacy on teacher innovation (Gkontelos et al., 2023; Zainal & Mohd Matore, 2021); and the direct influence of organizational climate and self-efficacy on teacher innovation (Lambriex-Schmitz et al., 2020; Vermeulen et al., 2022). Previous studies have focused only on accepting transformational leadership and organizational climate as predictors of teacher innovativeness. Past research has seen tiny exploring indicators of independent and dependent variables to be maintained and improved in action plans for changes in educational institutions. This research provides a new alternative to educational institutions to have guidelines for the better.

The novelty of this study is a sequential analysis of the influence of transformational leadership and organizational climate on teacher self-efficacy and innovation. Based on the results of previous studies, this study examines the role of leadership and organizational climate to develop and improve teacher self-efficacy and innovation. The findings of this study become a new model for developing and enhancing teacher innovation and teacher self-efficacy in educational organizations. Leadership roles, primarily transformational leadership, self-efficacy, and organizational climate, are essential variables that have not been explored in-depth and integrated. This study empirically analyzes factors to develop and improve teacher innovativeness and self-efficacy in educational organizations. This finding can motivate teachers and educational institutions to implement accessible and sustainable change. Another novelty of this study is that it presents variable indicators to be maintained and discussed through SITOREM analysis. This study investigates the extent to which indicators in research variables are selected to make changes in educational institutions as a priority.

2. Literature Review

Leadership roles in changing situations and environments require a transformational style compared to transactional and laissez-faire styles (Metaferia et al., 2022). Having transformational leadership involves communicating vision, developing staff, providing support, empowering staff, innovating, leading by example, and having charisma (Burić et al., 2021). In addition, scholars describe transformational leadership as a leader who can inspire followers to achieve the highest level of achievement, encourage employees to achieve goals further than expectations, persuade employees to give personal interests to the general welfare of the organization and play the role as the main force of the organization; encourage the development of new skills among employees and seek out opportunities to grow the organization relentlessly (Afsar & Masood, 2018; Metaferia et al., 2023; Phong & Son, 2020; Thompson et al., 2021). Research has shown that transformational leadership, such as peer variables and job satisfaction, can positively affect teachers' professional commitment (Arthi & Sumathi, 2020). In addition, organizational and leadership factors significantly influence teacher innovation behavior (Vermeulen et al., 2022). In other research, transformational leadership styles positively affect teacher innovation (Ismail et al., 2021; Vermeulen et al., 2022; Zainal & Mohd Matore, 2021).

Self-efficacy refers to a person's perception that they can obtain goals through personal actions and efforts (Anfajaya & Rahayu, 2020). According to Bandura (1978), a person's capacity for success is determined by how long they have been able to reap the rewards of their performance achievements, vicarious experiences, verbal persuasion, and physiological conditions (Bandura, 1978). Self-efficacy shapes attitudes to cope rather than give up, even when difficult situations arise, and encourages challenging responses to create high work performance. Conversely, people with low self-efficacy perceive that they do not have enough ability to achieve goals, so they avoid or give up, even in situations where the achievement of the task is easy (Choi & Kang, 2021). Self-efficacy is a theory of social learning developed by Bandura (1978); it is about how individuals learn in teams through direct experience that comes from one's work and observations that occur when one imitates the behavior of others (W. Kang, 2023). In the context of teachers, scholars define self-efficacy as a teacher's perception of their ability to succeed in engaging students, supporting learning, motivating students, and managing classes, even when faced with complex tasks in education (e.g., when working with students who are distracting, unmotivated, or disengaged in learning) (Ansley et al., 2021; Burić & Moè, 2020; Hammer et al., 2021; Liu & Hallinger, 2018). Self-efficacy mediates the interrelationships between leaders and members and encourages teachers' innovative behavior (Choi & Kang, 2021). Other research reinforces findings that teachers' self-efficacy is essential in mediating inclusive leadership and innovative work behaviors (Javed et al., 2021). Further empirical evidence is found that self-efficacy directly or as a moderator contributes to developing teacher innovation (Newman et al., 2018; Sharp et al., 2022; Zainal & Mohd Matore, 2021).

The organizational climate includes the school landscape and the components of learning resources, student relationships, communication, collaboration, leadership, decision-making, and learning innovation. Organizational climate refers to a person's general perception of an organization concerning organizational dimensions (Madhukar & Sharma, 2017). It is the organization's internal environment that includes teachers' physical, infrastructure, instructional, and emotional aspects that create a peaceful, comfortable, and pleasant environment (Don et al., 2021). The definition of organizational climate varies even though it has common ground, namely the subjective perception of employees about how their work environment affects them as individuals, influencing employees willing to go the extra mile for the organization, inspiring teachers positively or negatively in carrying out the learning process in school (Swart et al., 2021). Building a conducive organizational climate in schools is one of the challenges for principals, so they must learn leadership as well as possible (Barnová et al., 2022). Research shows that headmaster leadership impacts the organizational climate to improve a positive school environment for teachers and students to succeed (Swart et al., 2021). The state of the organizational climate is crucial because it affects many aspects, including motivation, performance, and creativity (Ahmad et al., 2023; Dicke et al., 2020; Mailool et al., 2020). Other research shows that organizational climate directly affects teacher innovation (Açikgöz & Günsel, 2011; Patras et al., 2021; Savitry et al., 2021).

Transformational leadership affects teachers' high and low self-efficacy. Transformational leadership is a behavior that influences and inspires followers to achieve outstanding results in the process of developing their leadership capacity to achieve organizational goals and vision (Rais et al., 2022). The transformational leadership style is successful in various countries, and leading educational institutions are implementing it (Firmansyah et al., 2022). One of the characteristics of this leadership style is setting an ideal example in school to influence student achievement (Kitur et al., 2020). During the COVID-19 pandemic and the transition of the learning process from conventional to digital (online), it was proven that the principal's ability to transform education was very effective (Aziz et al., 2022). Transformational leadership prioritizes value commitment, patterns, and performance to achieve organizational goals needed in the 21st Century (Firmansyah et al., 2022). In the context of organizations, transformational leadership affects other aspects, including teacher performance (Kitur et al., 2020), teacher commitment (Metaferia et al., 2023), and

teacher mental health (Lin et al., 2022). Moreover, transformational leadership affects the self-efficacy of teachers and teacher efficacy in groups (Kang, 2021; Musadad et al., 2022; Sánchez-Rosas et al., 2023).

The Organizational climate contributes to organizational success and employee satisfaction (Don et al., 2021). Schools with an excellent organizational climate will excel in their academic performance compared to schools that do not care about it. The characteristics of an organization having a creative environment include dialogue or discussion, support for new ideas, providing challenges to teachers, teacher involvement in decision-making, and trust/openness in the organization (Munir & Beh, 2019). Organizational climate refers to attributes specific to a particular organization relating to the organization's members and work environment (Faremi & Jita, 2019). Research results of Zakariya (2020) show that there is a substantial direct impact of the school climate on job satisfaction (Zakariya, 2020). The creative environment in the organization can encourage employee creativity to increase organizational innovation (Çekmecelioğlu & Günsel, 2013). It is evident that there are interactive effects of different organizational climates on innovative behavior. In addition to affecting job satisfaction and employee innovativeness, the organizational climate has also been shown to affect self-efficacy. Research available by Lim and Eo (2014) shows that organizational climate influences the collective efficacy of teachers in schools (Lim & Eo, 2014), and organizational climate affects teacher self-efficacy (Shah et al., 2022).

This research formulates the research problem based on issues and theoretical research on teacher innovativeness, transformational leadership of principals, teacher self-efficacy, and organizational climate:

RQ 1) Does the transformational leadership of principals have a significant impact on influencing teachers' innovativeness?

RQ 2) Does teacher self-efficacy have a significant impact on influencing teachers' innovativeness?

RQ 3) Does the organizational climate have a significant impact on teachers' innovativeness?

RQ 4) Does the principal's transformational leadership have a significant impact on teachers' self-efficacy?

RQ 5) Does the organizational climate have a significant impact on teachers' innovativeness?

RQ 6) Does transformational leadership have a significant impact on organizational climate?

3. Method

This study examines the strategic role of transformational leadership and organizational climate in promoting teacher self-efficacy and innovation in vocational secondary schools. To this aim, a survey research design was utilized. The population of the study was a total of 226 public vocational school teachers in Bogor City, Indonesia. The current study involved 145 teachers who volunteered. The study data was gathered through questionnaires. To this end, four questionnaires were developed by researchers based on theories about the variables studied. With the help of three experts from the field of organizational behavior, we examined the validity of the instrument and finalized the instrument. The validity and reliability of instruments are measured after expert validation using Pearson's Product Moment statistical technique and Cronbach's Alpha for SPSS-assisted instrument reliability. An instrument item is considered valid if its correlation value (r) is higher than .36. The reliability of the teacher innovation, transformational leadership, organizational climate, and self-efficacy instruments was .94, .97, .96, and .961, respectively. These values refer to reliable instruments that can be used for the main survey. A Google Form is used to collect data from the sample.

SPSS software was used to analyze data using the path analysis method. Path analysis results are deepened by indicator analysis. According to this study, the following indicators are used: The influence of idealism, inspirational motivation, intellectual stimulation, and individual consideration (Alzoraiki et al., 2023; Ismail et al., 2021; Kitur et al., 2020; Sánchez-Rosas et al., 2023). The organizational climate is measured using these indicators: the state of the physical

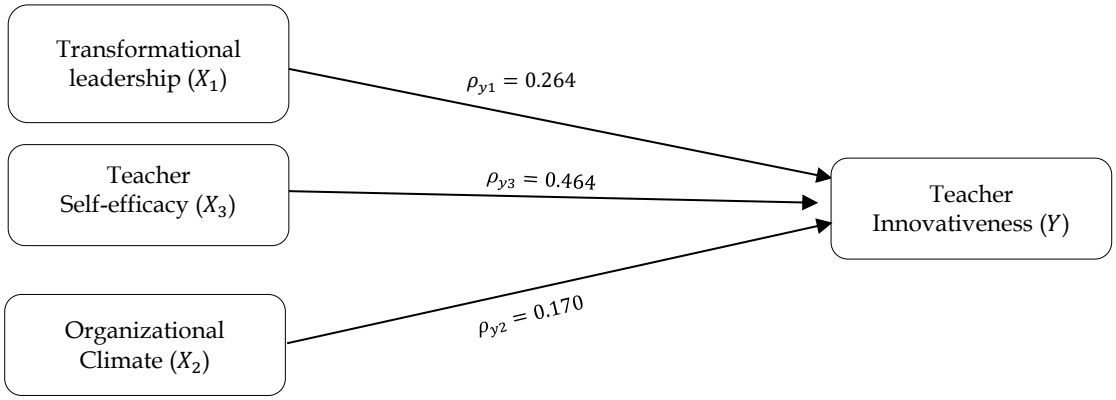
environment, the state of the social environment, the implementation of management systems, and personal freedom (Barnová et al., 2022; Li et al., 2020; Widyaningsih et al., 2021). Self-efficacy is measured using the following indicators: Self-confidence, work commitment, enthusiasm at work, and perseverance in facing challenges (Lazarides et al., 2021; Lin et al., 2022). Finally, following indicators were considered for teacher innovation: Acceptance of new ideas, creation of new ideas, application of new methods in learning, application of new services, and utilization of achieved results (Hosseini & Haghighi Shirazi, 2021; Vermeulen et al., 2022).

Additionally, priority indicators are determined using the SITOREM analysis method (Hardhienata, 2017) that has been used in various studies (Djami et al., 2019; Hidayat et al., 2020; Setyaningsih & Sunaryo, 2021). The first step in SITOREM analysis is to calculate the mean score of each indicator from each research variable. From the point of view of the research subjects, the average score of each indicator describes the actual condition of these indicators. The researcher calculated the average value based on the assessment of 3 experts using the criteria "Cost, Benefit, Urgency, and Importance" for each variable indicator (each variable consists of several indicators). After obtaining the average score of research results on each indicator and the weight (%) of each indicator, an analysis is conducted to determine the classification of variable research indicators, namely: (a) groups of indicators that need to be immediately improved with the provision of high weight values and low scores; and (b) groups of indicators that need to be maintained or developed provided that the values are high weight and high score. Furthermore, based on the indicators' ranking in each research variable, priorities can be determined for indicators that need to be immediately improved, maintained, or developed.

4. Results

Proof of leadership roles, organizational climate, and efficacy of teacher innovation is empirically illustrated from test results using statistical inferences through path analysis in sub-structural Model 1 (see Figure 1). Based on the picture, there is one endogenous variable, namely teacher innovativeness (Y), and three exogenous variables: transformational leadership (X_1), organizational climate (X_2), teacher self-efficacy (X_3), and other variables, namely: ε_4 not researched. Based on this analysis, the path analysis model in sub-structural 1 is as follows: $Y = \rho_{y1}X_1 + \rho_{y2}X_{2+}\ \rho_{y3}X_3 + \varepsilon_4$. Path analysis results are illustrated in Figure 1.

Figure 1
Path Analysis Model of Sub-structural-1

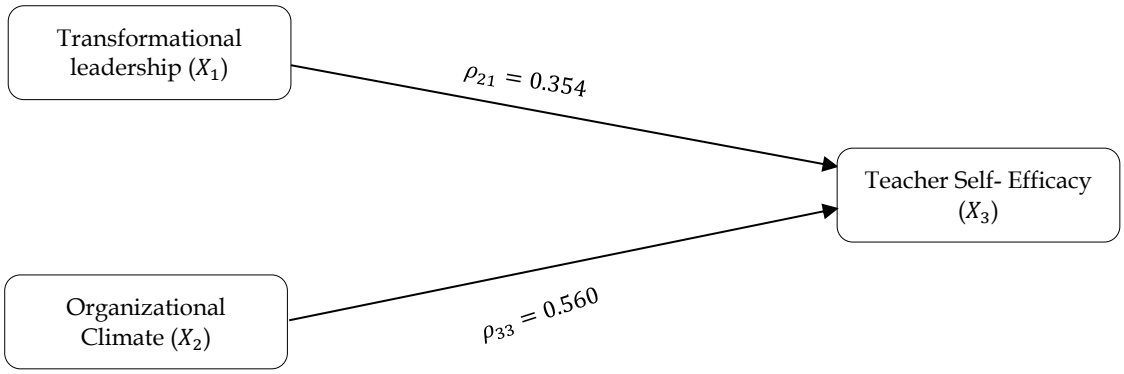


Based on Figure 1, the path coefficient X_1 towards Y is $\rho_{y1} = 0.264$, path coefficient X_2 towards Y is $\rho_{y2} = 0.170$, and path coefficient X_3 towards Y is $\rho_{y3} = 0.464$. The value of the residual variable path coefficient (ε_4) obtained from $\sqrt{1 - R^2} = \sqrt{1 - 0.699} = \sqrt{0.301} = 0.549$, which is the value of the coefficient of determination between innovation (Y) and transformational leadership (X_1), organizational climate (X_2), and teacher self-efficacy (X_3). So that the path analysis model on substructural-1 is obtained $Y = 0.264X_1 + 0.170X_{2+}\ 0.464X_3 + 0.549$.

Based on the *t*-test statistics, teacher innovation affected positively and statistically significantly by transformational leadership (t= 3.476, p = .001), organizational climate (t= 1.992, p = .048), and self-efficacy (t= 5.172, p = .000). This also means that teacher innovativeness can improve if transformational leadership, organizational climate, and teacher self-efficacy are improved. It is empirically proven that transformational leadership, organizational climate, and teacher self-efficacy in educational organizations are important in increasing teacher innovation.

Evidence of leadership roles' and organizational climate's effect on self-efficacy illustrates inferential statistical results using path analysis in sub-structural model-2 (see Figure 2). The relationship model between variables in sub-structural-2 consists of one endogenous variable, namely self-efficacy (X_3), and two exogenous variables, transformational leadership (X_1) and organizational climate (X_2), and one residual variable ε_3. Based on this relationship, the path analysis model in substructural-2 is as follows: $X_3 = \rho_{31}X_1 + \rho_{32}X_2 + \varepsilon_3$ that is summarized in Figure 2.

Figure 2
Path Analysis Model of Sub-structural-2

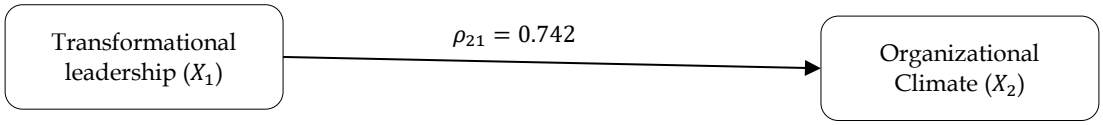


As can be seen in Figure 2 that the path coefficient X_1 (transformational leadership) towards X_3 (teacher self-efficacy) is $\rho_{31} = 0.354$ while path coefficient X_2 (organizational climate) towards X_3 (teacher self-efficacy) is $\rho_{32} = 0.560$. The value of the residual variable path coefficient (ε_3) obtained from $\sqrt{1 - R^2} = \sqrt{1 - 0.734} = \sqrt{0.266} = 0.516$, which is the value of the coefficient of determination between self-efficacy (X_3) with transformational leadership (X_1) and organizational climate (X_2). So that the path analysis model in substructural-2 is obtained as follows: $Y = 0.354X_1 + 0.560X_2 + 0.516$.

In addition, *t*-test results showed that both transformational leadership (t= 5.492, p = .000) and organizational climate (t= 8.688, p = .000) have direct, positive, and statistically significant effect on teacher self-efficacy. This highlights if transformational leadership is improved and the organizational climate is conducive, it can increase teacher self-efficacy. It is empirically proven that transformational leadership and organizational climate are critical in increasing teacher self-efficacy.

Empirical proof of the role of leadership in organizational climate is illustrated from the results of path analysis in the sub-structural model-3 (see Figure 3). The model of the relationship between variables in sub-structural-3 consists of one endogenous variable, namely organizational climate (X_2), and one exogenous variable (X_1), namely transformational leadership (X_1), and variable residue ε_2. Based on this relationship, the path analysis model in sub-structural-3 is as follows: $X_2 = \rho_{21}X_1 + \varepsilon_2$.

Figure 3
Path Analysis Model of Sub-structural-3



Based on analysis of *t*-test, transformational leadership was found to have a direct, positive, and statistically significant effect on organizational climate (t=13.227, $p = .000$). Path coefficient X_1 (transformational leadership) towards X_2 (organizational climate) was found to be $\rho_{21} = 0.742$. The value of the residual variable path coefficient (ε_2) obtained from the coefficient of determination value between organizational climates (X_2) and transformational leadership (X_1) is $\sqrt{1 - R^2} = \sqrt{1 - 0.550} = \sqrt{0.450} = 0.671$. Finally, the path analysis model in sub-structural-3 is obtained as $X_2 = 0.742X_1 + 0.671$. This refers that the organizational climate will improve if transformational leadership is improved. Table 1 summarizes the conclusions reached on all theories.

Table 1
Recapitulation of hypothesis testing results

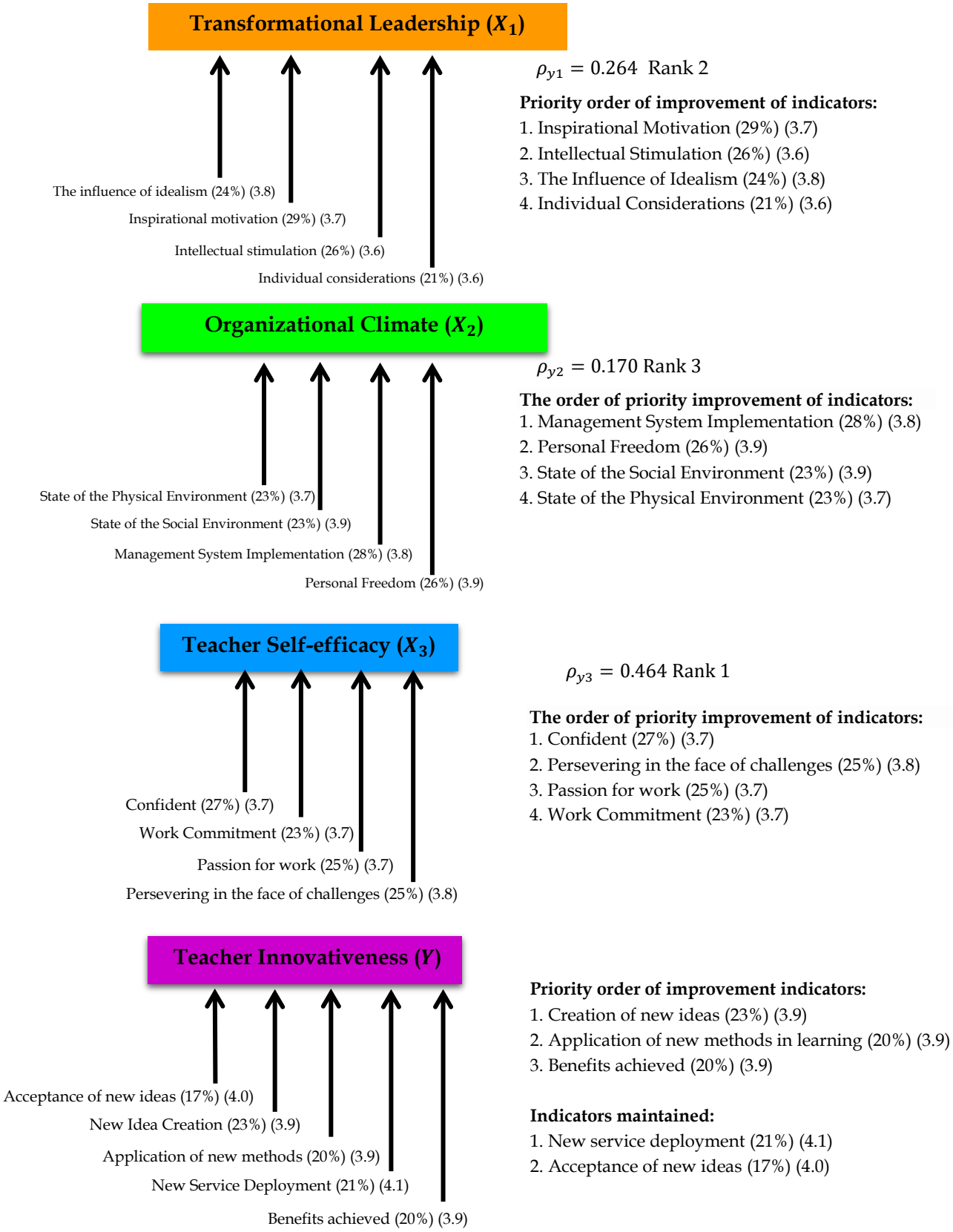
Variables	*Path Coefficient*	t *statistic*	t *table*	*Test Decision*
$X_1 \rightarrow Y$	0.264	3.476	1.9769	The hypothesis is accepted that transformational leadership has a significant positive direct effect on teacher innovativeness.
$X_2 \rightarrow Y$	0.170	1.992	1.9769	The hypothesis is accepted that organizational climate has a direct positive influence on teacher innovativeness.
$X_3 \rightarrow Y$	0.464	5.172	1.9769	The hypothesis is accepted that teacher self-efficacy has a direct positive influence on teacher innovativeness.
$X_1 \rightarrow X_3$	0.354	5.492	1.9768	The hypothesis is accepted that transformational leadership has a direct positive influence on teacher self-efficacy.
$X_2 \rightarrow X_3$	0.560	8.688	1.9768	The hypothesis that organizational climate has a direct positive influence on self-efficacy is accepted.
$X_1 \rightarrow X_2$	0.742	13.227	1.9767	The hypothesis is accepted that transformational leadership has a direct positive influence on organizational climate.

Based on the results of the SITOREM analysis to determine which indicators are maintained and which are corrected can be seen in Figure 4.

5. Discussion

Based on the results of this study, several significant findings are essential to discuss, namely: (1) a significant positive direct influence of transformational leadership on innovativeness, self-efficacy, and organizational climate; (2) a significant positive direct influence of organizational climate on innovativeness and self-efficacy; and (3) a significant positive direct influence of self-efficacy on teacher innovativeness. The endogenous variable increases if the state of the exogenous variable increases (Bashir et al., 2020; Ramli et al., 2022). For example, if transformational leadership as an

Figure 4
Results of the SITOREM analysis



exogenous variable increases, innovation, self-efficacy, and organizational climate will also increase. Another important finding is the priority to maintain and improve several indicators of the variables studied.

The findings of this study show that transformational leadership leads to increased innovativeness, self-efficacy, and organizational climate. The concept of transformational leadership refers to leadership that is based on ideas, motivation, intellectual stimulation, and individual consideration (Burić et al., 2021; Hermans, 2021; Sunaryo et al., 2023). Because the leader plays a central role in an organization, including an education organization, transformational leadership significantly influences teacher innovation, teacher self-efficacy, and organizational climate. (Burić et al., 2021; Cruz-González et al., 2021). Moreover, leaders' behaviors, mindsets, and attitudes can also motivate and inspire people within the organization (Netolicky, 2020). Conversely, bad leaders negatively affect an organization's performance and the performance of its employees (Manaa, 2022; Wolor et al., 2022). Thus, in transformational leadership, leaders can influence their employees with idealism, inspiration, intellectual stimulation, and individual consideration (Firmansyah et al., 2022). This is in line with previous research that transformative leadership affects positive outcomes in organizations, including work motivation (Djami et al., 2019; Sánchez-Rosas et al., 2023), job satisfaction (Djami et al., 2019), innovation (Khaola & Oni, 2020; Vermeulen et al., 2022), organizational climate (Barnová et al., 2022; Kim & Park, 2020; McCarley et al., 2016) and teacher self-efficacy (Sánchez-Rosas et al., 2023; Setyaningsih & Sunaryo, 2021). It is therefore essential to develop transformational leadership skills in educational management. This research proves that organizational climate contributes significantly to increased innovativeness and self-efficacy. Teacher perceptions of school climate are influenced by the physical environment, the social environment, the management system implemented, and the atmosphere of freedom for teachers (Manla, 2021; Molinari & Grazia, 2022). Geographic location, cleanliness, comfort, beauty, order, security, and the availability of school infrastructure all contribute to the quality of the physical environment. Personal relationships, cooperation, tolerance, and the workplace atmosphere constitute the social climate. Management systems include organizational characteristics, bureaucratic systems, power distribution, reward systems, conflict management, and resource allocation. Finally, teacher freedom is characterized by work procedures, role characteristics, and freedom of expression. The state of the environment that is well-perceived is proven in this study to increase innovativeness (Savitry et al., 2021; Shanker et al., 2017), and teacher self-efficacy (Shah et al., 2022; Zakariya, 2020). Several previous studies have shown that an organization's organizational climate influences organizational innovation (e.g. Shanker et al., 2017).

Furthermore, Ionica et al. (2019) found that a positive organizational climate leads to teachers being more innovative in schools. Additionally, it has been shown that the organizational environment affects a variety of variables, including teacher commitment and performance (Manla, 2021), job satisfaction (Adenike, 2011), and teaching motivation (Widyaningsih et al., 2021). Hence, improving the school's organizational climate is extremely important for improving educational quality.

Moreover, this study shows that teacher self-efficacy plays a significant role in teacher innovation. This study examined teacher self-efficacy as confidence, work commitment, enthusiasm at work, and persistence in tackling the challenges of carrying out duties as a teacher (Alfayez, 2022; Jerrim et al., 2023; Lazarides et al., 2021). Developing ICT skills, learning with various media, and creating a pleasant learning environment demonstrate teacher confidence. As a member of the working committee, the teacher fulfills his responsibilities, gives ideas, and contributes to the team's efforts. To be enthusiastic at work, one must always be enthusiastic, motivate other teachers, and inspire others, especially students. Teacher self-efficacy encourages teacher innovation in schools (Choi & Kang, 2021; Kang, 2023). According to Patras et al. (2021), teacher self-efficacy contributes significantly to teacher innovation. Theoretically, it can be explained that efficacy can encourage innovation because the teacher has high confidence to carry

out tasks successfully and has appropriate emotional management skills (Gkontelos et al., 2023). This follows previous research, which stated that efficacy is significant for teachers (Buri & Moè, 2020), and teacher self-efficacy can improve education quality (Hajovsky et al., 2020; Saglam et al., 2023; Wang et al., 2022).

According to the study, organizational actions were prioritized sequentially based on SITOREM analysis: self-efficacy, transformational leadership, and organizational climate. The improvement of these three variables impacts teacher innovation and other variables (Alzoraiki et al., 2023; Lan & Chen, 2020; Trigueros et al., 2020). The indicators that must be maintained are *the implementation of new services and the acceptance of new ideas*. The indicators must be kept because these two indicators have an empirical average value above 4 (scale 1-5). While the indicators that need to be improved immediately because, according to expert research, they have a significant influence, the average value of the empirical indicator is below 4, namely: *the creation of new ideas, the application of new methods in learning, providing inspiration, intellectual stimulation, individual consideration, physical environment, social environment, implementation of management systems, teacher freedom, teacher confidence, work commitment, enthusiasm for work, and persistence in facing challenges*. Priority findings actions to maintain and improve indicators and variables in the organization can be used in determining the design of education management in schools (Hardhienata, 2017; Hidayat & Patras, 2022; Setyaningsih & Sunaryo, 2021).

6. Conclusion

Education organizations will be more competitive in facing the challenges of change and intense competition between educational organizations as long as the organization optimally improves leadership and organizational climate. This research strengthens the theory and proves that implementing transformational leadership and a conducive school climate atmosphere can enhance teacher innovation and teacher self-efficacy. Through SITOREM analysis, this research helps decision-makers take concrete actions to improve indicators that are still below the average value and maintain indicators that are above the average.

7. Limitations and Educational Implications

This study examined variables and indicators of priority for improving teacher innovativeness and self-efficacy by optimizing the role of leadership and organizational climate in State vocational high schools. However, Indonesia's sociocultural and economic situation, school management situation, and research context differ from other countries. Further, the population, the number of samples, and the research instruments used differ from similar studies. Those differences are a limitation of this study that could lead to differences in results and recommendations in other countries.

Education organizations can use the recommendations from this study as discussion material to determine which variables and indicator variables must be maintained and improved as priorities. In Indonesia, school decision-makers like principals, heads of education foundations, and teachers must constantly implement new services and accept new ideas. In schools, there are a number of indicators that need to be improved, including the creation of new ideas, the application of new learning methods, inspiration, intellectual stimulation, individual consideration, the physical environment, the social environment, the implementation of management systems, teacher freedom, teacher confidence, commitment, enthusiasm for work, and persistence in facing challenges.

Acknowledgements: Acknowledgments: We are grateful for your hospitality and willingness to help me with this research. We are also grateful for the guidance and direction Mr/Mrs Teacher gave us. We hope that this research can be helpful for teachers, schools, and society.

Author contributions: All the authors contributed significantly to the conceptualization, analysis, and writing of this paper.

Ethics declaration: Author declared that the study was approved by Human Research Ethical Approval Committee of Universitas Pakuan on 08.25.2023 with approval code: 181/LPPM/VIII/2023.

Declaration of interest: No conflict of interest is declared by authors.

Funding: No funding source is reported for this study.

References

Açikgöz, A., & Günsel, A. (2011). The effects of organizational climate on team innovativeness. *Procedia - Social and Behavioral Sciences*, *24*, 920–927. https://doi.org/10.1016/j.sbspro.2011.09.102

Adenike, A. (2011). Organizational climate as a predictor of employee job satisfaction. *Business Intelligence Journal*, *4*(1), 151–165.

Afsar, B., & Masood, M. (2018). Transformational leadership, creative self-efficacy, trust in supervisor, uncertainty avoidance, and innovative work behavior of nurses. *The Journal of Applied Behavioral Science*, *54*(1), 36–61. https://doi.org/10.1177/0021886317711891

Ahmad, M., Suryadi, S., Matin, M., & Sugiarto, S. (2023). Organizational climate and quality of work-life in the creativity of teachers. *International Journal of Evaluation and Research in Education*, *12*(2), 905–913. https://doi.org/10.11591/ijere.v12i2.22738

Alfayez, A. F. (2022). Saudi Teachers' Self-Efficacy in Implementing the Arabic Language Integrative Curriculum. *Education Research International*, *2022,* 6823935. https://doi.org/10.1155/2022/6823935

Alzoraiki, M., Ahmad, A. R., Ateeq, A. A., Naji, G. M. A., Almaamari, Q., & Beshr, B. A. H. (2023). Impact of Teachers' Commitment to the Relationship between Transformational Leadership and Sustainable Teaching Performance. *Sustainability*, *15*(5), 4620. https://doi.org/10.3390/su15054620

Anfajaya, M. A., & Rahayu, A. (2020). The role of self-efficacy in organizational citizenship behavior. *Advances in Social Science, Education and Humanities Research*, *395*, 108–111. https://doi.org/10.2991/assehr.k.200120.024

Ansley, B. M., Houchins, D. E., Varjas, K., Roach, A., Patterson, D. S., & Hendrick, R. (2021). The impact of an online stress intervention on burnout and teacher efficacy. *Teaching and Teacher Education*, *98*, 103251. https://doi.org/10.1016/j.tate.2020.103251

Arthi, R., & Sumathi, G. N. (2020). Work-family conflict and professional commitment: Proactive effect of transformational leadership. *Problems and Perspectives in Management*, *18*(1), 97–106. https://doi.org/10.21511/ppm.18(1).2020.09

Aziz, A., Padil, M., Mujtahid, M., & Prihadi, K. D. (2022). Transformational leadership style in rural schools during pandemic: A case study in Indonesian non-WEIRD community. *International Journal of Evaluation and Research in Education*, *11*(2), 947–953. https://doi.org/10.11591/ijere.v11i2.22135

Bandura, A. (1978). Self-efficacy: Toward a unifying theory of behavioral change. *Advances in Behaviour Research and Therapy*, *1*(4), 139–161. https://doi.org/10.1016/0146-6402(78)90002-4

Barnová, S., Treľová, S., Krásna, S., Beňová, E., Hasajová, L., & Gabrhelová, G. (2022). Leadership styles, organizational climate, and school climate openness from the perspective of slovak vocational school teachers. *Societies*, *12*(6). https://doi.org/10.3390/soc12060192

Bashir, M. S., Haider, S., Asadullah, M. A., Ahmed, M., & Sajjad, M. (2020). Moderated mediation between transformational leadership and organizational commitment: the role of procedural justice and career growth opportunities. *SAGE Open*, *10*(2), 215824402093333. https://doi.org/10.1177/2158244020933336

Burić, I., & Moè, A. (2020). What makes teachers enthusiastic: The interplay of positive affect, self-efficacy and job satisfaction. *Teaching and Teacher Education*, *89,* 103008. https://doi.org/10.1016/j.tate.2019.103008

Burić, I., Parmač Kovačić, M., & Huić, A. (2021). Transformational leadership and instructional quality during the covid-19 pandemic: A moderated mediation analysis [Transformacijsko vodstvo i kvaliteta poučavanja tijekom pandemije covid-19: Moderirana medijacijska analiza]. *Drustvena Istrazivanja*, *30*(2), 181–202.

Çekmecelioğlu, H. G., & Günsel, A. (2013). The Effects of Individual Creativity and Organizational Climate on Firm Innovativeness. *Procedia - Social and Behavioral Sciences*, *99*, 257–264. https://doi.org/10.1016/j.sbspro.2013.10.493

Chand, V. S., Kuril, S., & Shukla, A. (2020). Dialoguing with teacher-educators, valorizing teacher innovations. *London Review of Education*, *18*(3), 451–466. https://doi.org/10.14324/LRE.18.3.09

Choi, W., & Kang, S. (2021). Innovative Behavior in the Workplace : An Empirical Study of Moderated Mediation Model of Self-Efficacy , Perceived. *Behavioral Science*, *11*(12), 182. https://doi.org/10.3390/bs11120182

Chou, C. M., Shen, C. H., Hsiao, H. C., & Shen, T. C. (2019). Factors influencing teachers' innovative teaching behaviour with information and communication technology (ICT): the mediator role of organisational innovation climate. *Educational Psychology*, *39*(1), 65–85. https://doi.org/10.1080/01443410.2018.1520201

Cruz-González, C., Rodríguez, C. L., & Segovia, J. D. (2021). A systematic review of principals' leadership identity from 1993 to 2019. *Educational Management Administration & Leadership*, *49*(1), 31–53. https://doi.org/10.1177/1741143219896053

Dicke, T., Marsh, H. W., Parker, P. D., Guo, J., Riley, P., & Waldeyer, J. (2020). Job satisfaction of teachers and their principals in relation to climate and student achievement. *Journal of Educational Psychology*, *112*(5), 1061–1073. https://doi.org/10.1037/edu0000409

Djami, M. E. U., Hardhienata, S., & Tukiran, M. (2019). Improvement of job satisfaction through transformational leadership, personality, and achievement motivation by using scientific identification theory of operation research in education management (SITOREM). *International Journal of Managerial Studies and Research*, *7*(4), 0704009. https://doi.org/10.20431/2349-0349.0704009

Don, Y., Yaakob, M. F. M., Wan Hanafi, W. R., Yusof, M. R., Kasa, M. D., Omar-Fauzee, M. S., & In-Keeree, H. K. (2021). Challenges for using organizational climate tools for measuring teacher job satisfaction. *International Journal of Evaluation and Research in Education*, *10*(2), 465–475. https://doi.org/10.11591/ijere.v10i2.20703

Faremi, Y. A., & Jita, L. C. (2019). Assessment of science teachers' career satisfaction and school organisational climate in enhancing job performance in rural learning ecologies. *Problems of Education in the 21st Century*, *77*(2), 254–269. https://doi.org/10.33225/pec/19.77.254

Firmansyah, F., Prasojo, L. D., Jaedun, A., & Retnawati, H. (2022). Transformational leadership effect on teacher performance in Asia: A meta-analysis. *Cypriot Journal of Educational Sciences*, *17*(6), 2127–2146. https://doi.org/10.18844/cjes.v17i6.7552

Gkontelos, A., Vaiopoulou, J., & Stamovlasis, D. (2023). Teachers' innovative work behavior as a function of self-efficacy, burnout, and irrational beliefs: a structural equation model. *European Journal of Investigation in Health, Psychology and Education*, *13*(2), 403–418. https://doi.org/10.3390/ejihpe13020030

Hajovsky, D. B., Chesnut, S. R., & Jensen, K. M. (2020). The role of teachers ' self-efficacy beliefs in the development of teacher-student relationships. *Journal of School Psychology*, *82*, 141–158. https://doi.org/10.1016/j.jsp.2020.09.001

Hammer, M., Scheiter, K., & Stürmer, K. (2021). New technology , new role of parents : How parents ' beliefs and behavior affect students ' digital media self-efficacy. *Computers in Human Behavior*, *116*, 106642. https://doi.org/10.1016/j.chb.2020.106642

Hardhienata, S. (2017). The development of scientific identification theory to conduct operation research in education management. *IOP Conference Series: Materials Science and Engineering*, *755*(1), 011001. https://doi.org/10.1088/1742-6596/755/1/011001

Hermans, C. A. M. (2021). Discernment as predictor for transformational leadership: a study of school leaders in Catholic schools in India. *Journal of Beliefs and Values*, *42*(3), 393–408. https://doi.org/10.1080/13617672.2020.1852815

Hidayat, R., Hardhienata, S., Patras, Y. E., & Agustin, R. R. (2020). The effects of situational leadership and self-efficacy on the improvement of teachers ' work productivity using correlation analysis and SITOREM. *COUNS-EDU :The International Journal of Counseling and Education*, *5*(1), 6–14.

Hidayat, R., & Patras, Y. E. (2022). The effect of organizational trust and job satisfaction on teachers' organizational citizenship behavior (OCB) in private senior high schools. *AL-TANZIM: Jurnal Manajemen Pendidikan Islam*, *6*(4), 1049–1063. https://doi.org/10.33650/al-tanzim.v6i4.3488

Hill, J., & France, D. (2020). Innovative pedagogies. In A. Kobayashi (Ed.), *International encyclopedia of human geography* (pp. 331-339). Elsevier. https://doi.org/10.1016/B978-0-08-102295-5.10657-2

Hosseini, S., & Haghighi Shirazi, Z. R. (2021). Towards teacher innovative work behavior: A conceptual model. *Cogent Education*, *8*(1), 1869364. https://doi.org/10.1080/2331186X.2020.1869364

Ionica, A., Nassar, Y., & Mangu, S. (2019). Organizational climate aspects and principal's burnout in Southern Israel schools. *MATEC Web of Conferences*, *290*, 7009. https://doi.org/10.1051/matecconf/201929007009

Ismail, A., Ahmad, N. S., & Aman, R. C. (2021). Gender of transformational school principals and teachers' innovative behavior. *International Journal of Evaluation and Research in Education*, *10*(3), 747–752. https://doi.org/10.11591/ijere.v10i3.21448

Javed, B., Fatima, T., Khan, A. K., & Bashir, S. (2021). Impact of inclusive leadership on innovative work behavior: the role of creative self-efficacy. *Journal of Creative Behavior*, *55*(3), 769–782. https://doi.org/10.1002/jocb.487

Jerrim, J., Sims, S., & Oliver, M. (2023). Teacher self-efficacy and pupil achievement: much ado about nothing? International evidence from TIMSS. *Teachers and Teaching: Theory and Practice*, *29*(2), 2159365. https://doi.org/10.1080/13540602.2022.2159365

Kang, W. (2021). Explaining effects of transformational leadership on teachers' cooperative professional development through structural equation model and phantom model approach. *Sustainability*, *13*(19), 131910888. https://doi.org/10.3390/su131910888

Kang, W. (2023). Innovative School Climate, Teacher's Self-efficacy and Implementation of Cognitive Activation Strategies. *Pegem Journal of Education and Instruction*, *13*(2), 126–133. https://doi.org/10.47750/pegegog.13.02.16

Khaola, P. P., & Oni, F. A. (2020). The influence of school principals' leadership behaviour and act of fairness on innovative work behaviours amongst teachers. *SA Journal of Human Resource Management*, *18*, 1–8. https://doi.org/10.4102/sajhrm.v18i0.1417

Kim, E. J., & Park, S. (2020). Transformational leadership, knowledge sharing, organizational climate and learning: an empirical study. *Leadership and Organization Development Journal*, *41*(6), 761–775. https://doi.org/10.1108/LODJ-12-2018-0455

Kitur, K., Choge, J., & Tanui, E. (2020). Relationship between principals' transformational leadership style and secondary school students' academic performance in Kenya Certificate of secondary education in Bomet County, Kenya. *Universal Journal of Educational Research*, *8*(2), 402–409. https://doi.org/10.13189/ujer.2020.080210

Lambriex-Schmitz, P., Van der Klink, M. R., Beausaert, S., Bijker, M., & Segers, M. (2020). When innovation in education works: stimulating teachers' innovative work behaviour. *International Journal of Training and Development*, *24*(2), 118–134. https://doi.org/10.1111/ijtd.12175

Lan, Y., & Chen, Z. (2020). Transformational Leadership, Career Adaptability, and Work Behaviors: The Moderating Role of Task Variety. *Frontiers in Psychology*, *10*, 02922. https://doi.org/10.3389/fpsyg.2019.02922

Lazarides, R., Fauth, B., Gaspard, H., & Richard, G. (2021). Teacher self-efficacy and enthusiasm : Relations to changes in student-perceived teaching quality at the beginning of. *Learning and Instruction Journal*, *73*, 101435. https://doi.org/10.1016/j.learninstruc.2020.101435

Li, Y., Huang, H., & Chen, Y. Y. (2020). Organizational climate, job satisfaction, and turnover in voluntary child welfare workers. *Children and Youth Services Review*, *119*, 105640. https://doi.org/10.1016/j.childyouth.2020.105640

Lim, S., & Eo, S. (2014). The mediating roles of collective teacher efficacy in the relations of teachers' perceptions of school organizational climate to their burnout. *Teaching and Teacher Education*, *44*, 138–147. https://doi.org/10.1016/j.tate.2014.08.007

Lin, W., Yin, H., & Liu, Z. (2022). The roles of transformational leadership and growth mindset in teacher professional development: the mediation of teacher self-efficacy. *Sustainability*, *14*(11), 6489. https://doi.org/10.3390/su14116489

Liu, S., & Hallinger, P. (2018). Principal instructional leadership, teacher self-efficacy, and teacher professional learning in china: testing a mediated-effects model. *Educational Administration Quarterly*, *54*(4), 501–528. https://doi.org/10.1177/0013161X18769048

Madhukar, V., & Sharma, S. (2017). Organisational climate: a conceptual perspective. *International Journal of Management, IT and Engineering*, *7*(8), 276–293.

Mailool, J., Kartowagiran, B., Retnowati, T. H., Wening, S., & Putranta, H. (2020). The effects of principal's decision-making, organizational commitment and school climate on teacher performance in vocational high school based on teacher perceptions. *European Journal of Educational Research*, *9*(4), 1675–1687. https://doi.org/10.12973/EU-JER.9.4.1675

Manaa, Y. H. (2022). The effect of toxic leadership on counter-productive work behaviors and intention to leave: an empirical study. *International Business Research*, *15*(11), 1-10. https://doi.org/10.5539/ibr.v15n11p1

Manla, V. H. (2021). School climate: Its impact on teachers' commitment and school performance. *Journal of World Englishes and Educational Practices*, *3*(2), 21–35. https://doi.org/10.32996/jweep.2021.3.2.3

McCarley, T. A., Peters, M. L., & Decman, J. M. (2016). Transformational leadership related to school climate: A multi-level analysis. *Educational Management Administration and Leadership*, *44*(2), 322–342. https://doi.org/10.1177/1741143214549966

Metaferia, T., Baraki, Z., & Mebratu, B. (2023). Link between transformational leadership and teachers organizational commitment in Addis Ababa government secondary schools. *Cogent Education*, *10*(1), 2187563. https://doi.org/10.1080/2331186x.2023.2187563

Molinari, L., & Grazia, V. (2022). A multi-informant study of school climate: student, parent, and teacher perceptions. *European Journal of Psychology of Education*, *38,* 1403-1423. https://doi.org/10.1007/s10212-022-00655-4

Munir, R., & Beh, L. S. (2019). Measuring and enhancing organisational creative climate, knowledge sharing, and innovative work behavior in startups development. *Bottom Line*, *32*(4), 269–289. https://doi.org/10.1108/BL-03-2019-0076

Musadad, A. A., Sumarsono, R. B., Adha, M. A., Ariyanti, N. S., Abidin, N. F., & Kurniawan, D. A. (2022). Principal transformational leadership and teacher readiness to teach: Mediating role of self-efficacy. *International Journal of Evaluation and Research in Education*, *11*(4), 1798–1807. https://doi.org/10.11591/ijere.v11i4.23259

Netolicky, D. M. (2020). School leadership during a pandemic : navigating tensions. *Journal of Professional Capital and Community*, *5*(3), 391–395. https://doi.org/10.1108/JPCC-05-2020-0017

Newman, A., Tse, H. H. M., Schwarz, G., & Nielsen, I. (2018). The effects of employees' creative self-efficacy on innovative behavior: The role of entrepreneurial leadership. *Journal of Business Research*, *89*, 1–9. https://doi.org/10.1016/j.jbusres.2018.04.001

Nguyen, D., Pietsch, M., & Gümüs, S. (2021). Collective teacher innovativeness in 48 countries : Effects of teacher autonomy , collaborative culture , and professional learning. *Teaching and Teacher Education*, *106,* 103463. https://doi.org/10.1016/j.tate.2021.103463

Nguyen, T. P. L., Nguyen, K. N., Do, T. D., & Nguyen, T. T. M. (2019). Knowledge sharing and innovative work behavior: The case of Vietnam. *Uncertain Supply Chain Management*, *7*(4), 619–634. https://doi.org/10.5267/j.uscm.2019.5.001

Nurjaman, K., Marta, M. S., Eliyana, A., Kurniasari, D., & Kurniasari, D. (2019). Proactive work behavior and innovative work behavior: Moderating effect of job characteristics. *Humanities and Social Sciences Reviews*, *7*(6), 373–379. https://doi.org/10.18510/hssr.2019.7663

Patras, Y. E., Hidayat, R., & Billah, M. A. (2021). Contribution and priority action of the self-efficacy and organizational climate to improve innovative work behavior. *Tadbir : Jurnal Studi Manajemen Pendidikan*, *5*(2), 2941. https://doi.org/10.29240/jsmp.v5i2.2941

Phong, L. B., & Son, T. T. (2020). The Link between Transformational Leadership and Knowledge Sharing: Mediating Role of Distributive, Procedural and Interactional Justice. *Journal of Information and Knowledge Management*, *19*(3), 500203. https://doi.org/10.1142/S0219649220500203

Rad, H. F., Shahi, S., & Fazeli, A. (2021). The role of transformational leadership and knowledge management in organizational innovation of schools. *Education and Self Development*, *16*(1), 40–53. https://doi.org/10.26907/esd16.1.05

Rais, S., Rubini, B., & Herfina. (2022). Increasing teacher creativity through strengthening transformational leadership, teamwork, and work engagement. *Pegem Journal of Education and Instruction*, *12*(1), 232–241. https://doi.org/10.47750/pegegog.12.01.24

Ramli, S., Rasul, M. S., Mohd Affandi, H., Abd Rauf, R. A., & Pranita, D. (2022). Analysing teaching strategy, reflection and networking indicators towards learning for sustainable development (LSD) of green skills. *Journal of Technical Education and Training*, *14*(1), 63–74. https://doi.org/10.30880/jtet.2022.14.01.006

Saglam, M. H., Goktenturk, T., Demir, I., & Yazıcı, E. (2023). Environmental factors for the advancement of teachers' self-efficacy in professional development. *Journal of Intelligence*, *11*(2), 28. https://doi.org/10.3390/jintelligence11020028

Sánchez-Rosas, J., Dyzenchauz, M., Dominguez-Lara, S., & Hayes, A. (2022). Collective teacher self-efficacy scale for elementary school teachers. *International Journal of Instruction*, *15*(1), 985–1002. https://doi.org/10.29333/iji.2022.15156a

Sánchez-Rosas, J., Dyzenchauz, M., Freiberg-Hoffmann, A., & Okinishi, M. (2023). Transformational leadership and collective teacher self-efficacy: the mediating role of satisfaction with job resources. *International Journal of Instruction*, *16*(1), 801–820. https://doi.org/10.29333/iji.2023.16145a

Savitry, N. Z., Sulastiana, M., & Yanuarti, N. (2021). The effects of learning climate on innovative work behavior in digital start-up company. *Almana : Jurnal Manajemen Dan Bisnis*, *5*(1), 47–53. https://doi.org/10.36555/almana.v5i1.1536

Setyaningsih, S., & Sunaryo, W. (2021). Optimizing transformational leadership strengthening, self efficacy, and job satisfaction to increase teacher commitment. *International Journal of Instruction*, *14*(4), 427–438. https://doi.org/10.29333/iji.2021.14425a

Shah, N. H., Shaheen, I., & Abbas, A. (2022). Effect of organizational climate on self-efficacy of Teachers at secondary school level in Azad Jammu and Kashmir. *Journal of Social Sciences Advancement*, *3*(4), 212–217. https://doi.org/10.52223/jssa22-030403-49

Shanker, R., Bhanugopan, R., van der Heijden, B. I. J. M., & Farrell, M. (2017). Organizational climate for innovation and organizational performance: The mediating effect of innovative work behavior. *Journal of Vocational Behavior*, *100*, 67–77. https://doi.org/10.1016/j.jvb.2017.02.004

Sharp, S. R., Rutherford, G. L., & Echols, K. I. (2022). Creative science through inquiry: improving teacher self-efficacy and outcome expectancy through adaptable, mystery-based professional development. *International Journal of Innovation in Science and Mathematics Education*, *30*(1), 57–69. https://doi.org/10.30722/ijisme.30.01.005

Sunaryo, W., Yusnita, N., Herfina, H., Wulandari, D., & Suhendra, S. (2023). International Journal of Data and Network Science The effects of digital transformational leadership, work environment and motivation on reinforc- ing job satisfaction : Evidence from vocational schools. International *Journal of Data and Network Science, 7*, 883–890. https://doi.org/10.5267/j.ijdns.2022.12.023

Swart, C., Pottas, L., & Maree, D. (2021). Servant school leadership and organisational climate in south african private schools. *Education Research International*, *2021*, 8568889. https://doi.org/10.1155/2021/8568889

Thompson, G., Buch, R., Thompson, P. M. M., & Glasø, L. (2021). The impact of transformational leadership and interactional justice on follower performance and organizational commitment in a business context. *Journal of General Management*, *46*(4), 274–283. https://doi.org/10.1177/0306307020984579

Trigueros, R., Padilla, A., Aguilar-Parra, J. M., Mercader, I., López-Liria, R., & Rocamora, P. (2020). The influence of transformational teacher leadership on academic motivation and resilience, burnout and academic performance. *International Journal of Environmental Research and Public Health*, *17*(20), 7687. https://doi.org/10.3390/ijerph17207687

Vermeulen, M., Kreijns, K., & Evers, A. T. (2022). Transformational leadership, leader–member exchange and school learning climate: Impact on teachers' innovative behaviour in the Netherlands. *Educational Management Administration and Leadership*, *50*(3), 491–510. https://doi.org/10.1177/1741143220932582

Wang, T., Deng, M., & Tian, G. (2022). More Leadership, More Efficacy for Inclusive Practices? Exploring the Relationships between Distributed Leadership, Teacher Leadership, and Self-Efficacy among Inclusive Education Teachers in China. *Sustainability*, *14*(23), 16168. https://doi.org/10.3390/su142316168

Widyaningsih, H., Darmawan, R., & Pelana, R. (2021). Influence of organizational climate and teaching motivation on the performance of physical education teachers. *Journal of Physical Education and Sport*, *21*(4), 2408–2412. https://doi.org/10.7752/jpes.2021.s4323

Wolor, C. W., Ardiansyah, A., Rofaida, R., Nurkhin, A., & Rababah, M. A. (2022). Impact of Toxic Leadership on Employee Performance. *Health Psychology Research*, *10*(4), 1–10. https://doi.org/10.52965/001C.57551

Yilmaz, O., & Bayraktar, D. M. (2014). Teachers ' attitudes towards the use of educational technologies and their individual innovativeness categories. *Procedia - Social and Behavioral Sciences*, *116*, 3458–3461. https://doi.org/10.1016/j.sbspro.2014.01.783

Zainal, M. A., & Mohd Matore, M. E. E. (2021). The influence of teachers' self-efficacy and school leaders' transformational leadership practices on teachers' innovative behaviour. *International Journal of Environmental Research and Public Health*, *18*(12), 6423. https://doi.org/10.3390/ijerph18126423

Zakariya, Y. F. (2020). Effects of school climate and teacher self-efficacy on job satisfaction of mostly STEM teachers: a structural multigroup invariance approach. *International Journal of STEM Education*, *7*(1), 209. https://doi.org/10.1186/s40594-020-00209-4